

BIOLOGICAL RESOURCES

The purpose of this document is to provide information on rare species and fishery resources that could potentially be affected by the Cobbs Creek Reservoir Project.

1 RARE SPECIES

The Virginia Department of Conservation and Recreation (DCR), Division of Natural Heritage (DNH) was contacted regarding documented occurrences of natural heritage resources in Cumberland County. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geological formations. DNH responded in a letter dated March 3, 2005 that is included at the end of this section. In their response they indicated that no state or federally listed species, natural community, or geological formation are known to occur within the proposed project area; however, the potential does exist for several rare species to inhabit the project area.

A list of species of concern that have been documented within Cumberland County can be found in Table 1. Of the listed species in Cumberland County, only two have legal status: the Atlantic Pigtoe (G2, S2, F-SOC, S-LT) and the Loggerhead Shrike (G4, S2B, S3N, S-LT) (see Table 1 for code explanations). The Atlantic Pigtoe and Loggerhead Shrike were last documented in the county in 1966 and 1993, respectively. However, neither of these species have been documented within the project area and were not mentioned in DNH's March 2005 project area review.

The Division of Natural Heritage stated that the potential exists for the highlighted species/communities in Table 1 to occur within the project area. It should be noted that of these potential occurring species/communities, only the yellow lance and the Basic Oak-Hickory forest have been observed within the County (in 1966 and 2000, respectively).

Additional information on the Yellow Lance, the only species of concern listed in DNH's letter, is provided below. The other rare species listed in DNH's letter are insects that are rare in Virginia, but are not classified as species of concern.

Yellow Lance

General Description

The Yellow Lance (*Elliptio lanceolata*) is a mussel that has shells over twice as long as tall (Figure 1). The periostracum (exterior of the shell) is usually bright yellow with brown discolorations (Figure 1a). Populations of uniformly yellow or brown shelled individuals also exist, but not in the same location. The nacre (interior of the shell) ranges from salmon to white to an iridescent blue color (Figure 1b). The posterior ridge is distinctly rounded and curves dorsally toward the posterior end. Brownish growth rests are clearly evident on the periostracum.



(a) periostracum (exterior)



(b) nacre (interior)

FIGURE 1
YELLOW LANCE
Elliptio lanceolata

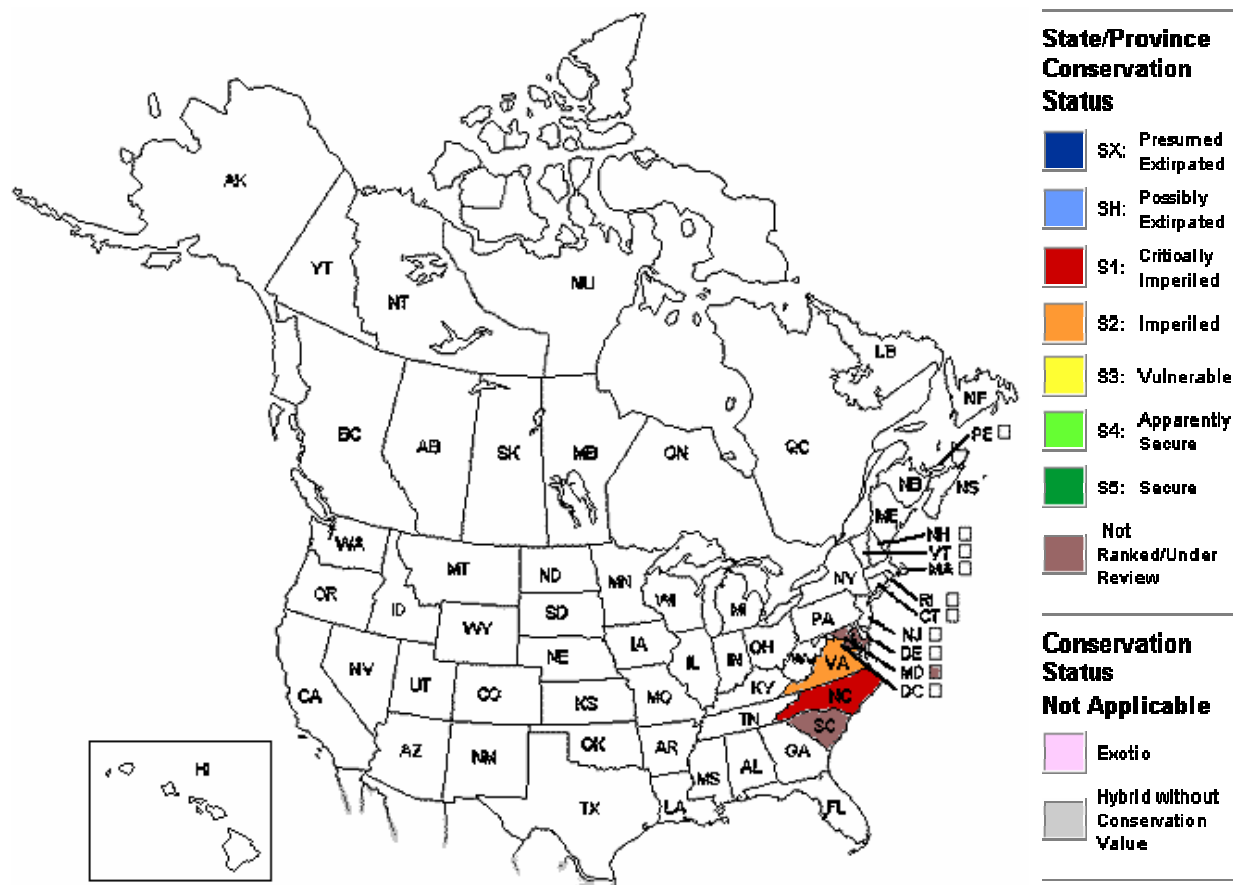


FIGURE 2
YELLOW LANCE RANGE/STATUS

Habitat

The Yellow Lance inhabits clean, coarse to medium sands substrate freshwater stream. Specimens are also found occasionally in gravel substrates. It can be found in streams ranging from 1 meter wide to the main channels of large rivers in Atlantic Coastal Basins (Figure 2). Historically, its range has been from the Satilla River, Georgia in the south to the Susquehanna River, Pennsylvania in the north; although, it is more likely to range from the Tar-Neuse River System, North Carolina in the South to the Rappahannock River, Virginia in the north [Nature Serve, 2005].

Status

The Yellow Lance is currently listed in the Commonwealth of Virginia as a species of concern (SC), and federally listed as a species of concern (SOC).

Life Cycle

Little is known of the life history of the yellow lance. Gravid females have been observed during the spring in the James River, Virginia and in the Tar River Basin in June. Gravid females are those that have glochidia (parasitic lifestage) or young mussels present in the gills. No host fish species has been determined for the yellow lance.

2 FISHERY RESOURCES

Fishery data from Virginia Department of Game and Inland Fisheries (VDGIF) was obtained to estimate baseline conditions in the James River in the Cobbs Creek Reservoir Project vicinity at James River Mile (JRM) 160 with respect to the American Shad. Of the anadromous fish species using Virginia waters, American Shad has received the most attention in recent years due to significant efforts to restore the fishery. Data collected include the following juvenile fish surveys conducted above Boshers Dam (JRM 113.3):

- 2002 to 2004 Juvenile Shad Push Net Surveys (Figure 3)
- 1997-2001 Juvenile Shad Snorkel Surveys (Figure 4)
- 2001-2003 Juvenile Shad Electrofishing Surveys (Figure 5)

The data provided by VDGIF can also be found in Tables 2 through 4. Of the three multi-year surveys conducted, only the snorkel survey was conducted both above and below the proposed intake site. No shad were observed above the proposed intake site. The apparent upstream limit of juvenile shad based on the snorkel data is somewhere between Columbia (JRM 158) and Bremono Bluff (JRM 167).

Additional information on the American Shad is provided below.

General Description and Life History Characteristics

American shad (*Alosa sapidissima*) is one of three anadromous members of the herring family, Clupeidae. This species spends most of its life cycle in ocean waters and returns to freshwater areas of natal streams only during spring spawning runs (Weiss-Glanz et al. 1986). Spawning of American shad commonly occurs in larger coastal streams and rivers from the St. Johns River, Florida to the St. Lawrence River

although the area from Connecticut to North Carolina is considered to be its center of abundance (Weiss-Glanz et al. 1986).

Throughout their geographic range, American shad is a popular target for commercial and recreational fishermen. American shad are a relatively fecund species with annual egg productions ranging from 150,000 to more than 500,000 eggs per female (Weiss-Glanz et al. 1986).

American shad uses virtually all of the major tributaries to Chesapeake Bay as spawning and nursery habitat. In these tributaries, adult shad move from the ocean to shallow freshwater spawning areas beginning in mid- to late March, returning rapidly to the ocean after spawning. Most spawning occurs from late March through May with more southern tributaries having slightly earlier spawns than the more northern tributaries. Spawning typically occurs in the main stem freshwater areas of these tributaries upstream of brackish water. In some systems, shad will migrate hundreds of miles upstream to spawn (Weiss-Glanz et al. 1986). Spawning most commonly occurs when water temperatures are between 56° and 68°F with peak spawning when temperatures are 65°F (Weiss-Glanz et al. 1986). Spawning appears to occur principally at night in shallow areas of the river (Marcy 1976; Ross et al. 1993; Paller et al. 1995). Since American shad eggs are slightly denser than water they gradually sink towards the bottom (Marcy 1976; Ross et al. 1993). There, the non-adhesive eggs can become lodged on the bottom and remain within spawning areas, or drift downstream along the bottom (Ross et al. 1993).

Fertilized American shad eggs are 2.5 to 3.5 mm in diameter and typically hatch in 6 to 15 days, depending on water temperature (Collette and Klein-MacPhee 2002). At hatch, shad larvae average 6 to 7 mm long. These newly hatched American shad are planktonic and are gradually transported downstream as they rapidly grow and develop (Marcy 1976). During the larval stage, shad remain primarily in fresh and low salinity brackish areas of their natal streams. Yolk sac absorption is complete within four to seven days of hatch when the larvae reach an average length of 12 mm (TL) (Marcy 1976). At that time, larvae begin to actively feed on a variety of smaller plankton. As they grow, larval and early juvenile American shad remain within the water column and begin to exhibit strong schooling behavior. Young American shad reach adult appearance during the juvenile phase when they are approximately one month old and one inch long. These juveniles remain in fresh and low salinity brackish water nursery areas throughout the summer months. As water temperatures decline, juvenile shad depart these nursery areas for higher salinity overwintering areas of the Bay and nearshore marine waters. This emigration begins in late August or early September and is essentially complete in December. At the time of emigration, juvenile American shad average three-to-four inches long and are active swimmers. Juvenile shad apparently remain offshore until maturity. Most American shad reach sexual maturity when they are three-to-six years old.

American shad are plankton feeders. Larvae and young shad eat copepods and related crustaceans and insect larvae (chironomids) while they are in fresh water (Scott and Crossman 1973). Migrating fish eat little prior to spawning but commence feeding during downstream post-spawning migration. In addition, juvenile and adult American shad provide forage for a variety of piscine and avian predators, trophically linking the Estuary's zooplankton production with higher predators. Many of these larger predators are important recreational and commercial resources.

REFERENCES

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TABLE 1

Rare Species in Cumberland County, VA

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Last Year Observed
BIRDS						
Lanius ludovicianus	Loggerhead Shrike	G4	S2B,S3N		LT	1993
BIVALVIA (MUSSELS)						
Elliptio lanceolata	Yellow Lance	G2G3	S2S3	SOC	SC	1966
Fusconaia masoni	Atlantic Pigtoe	G2	S2	SOC	LT	1966
Lasmigona subviridis	Green Floater	G3	S2		SC	1966
Lexingtonia subplana	Virginia Pigtoe	G1Q	S1	SOC		1966
COMMUNITIES						
Natural Community	Basic Mesic Forest	GNR	SNR			--
Natural Community	Basic Oak - Hickory Forest	GNR	SNR			2000
Natural Community	Mesic Mixed Hardwood Forest	GNR	SNR			2000
Natural Community	Mountain / Piedmont Acidic Seepage Swamp	GNR	SNR			--
Natural Community	Mountain / Piedmont Basic Seepage Swamp	GNR	S2			--
Natural Community	Piedmont Hardpan Forest	GNR	SNR			2000
Natural Community	Upland Depression Swamp	GNR	SNR			2000
ODONATA (DRAGONFLIES & DAMSELFLIES)						
Gomphus parvidens	Piedmont Clubtail	G4	S1			--
Helocordulia selysii	Selys' Sundragon	G4	S2			--
Ophiogomphus incurvatus incurvatus	Appalachian Snaketail	G3T3	S1			--
VASCULAR PLANTS						
Eryngium yuccifolium var. yuccifolium	Rattlesnake-master	G5T5	S2			1980
Phlox pilosa ssp. pilosa	Downy Phlox	G5T5	S2			1988
Quercus prinoides	Dwarf Chinquapin Oak	G5	S1			1993
Rorippa sessiliflora	Stalkless Yellowcress	G5	S1			1995
Scutellaria incana	Hoary Skullcap	G5	S2			1995

State Ranks

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

S1 - Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer populations or occurrences; or very few remaining individuals (<1000).

S2 - Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 populations or occurrences or few remaining individuals (1,000 to 3,000).

S3 - Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 populations or occurrences (1,000 to 3,000).

S4 - Apparently secure; Uncommon but not rare, and usually widespread in the state. Possible cause of long-term concern. Usually >100 populations or occurrences and more than 10,000 individuals.

S5 - Secure; Common, widespread and abundant in the state. Essentially ineradicable under present conditions. Typically with considerably more than 100 populations or occurrences and more than 10,000 individuals.

S#B - Breeding status of an animal within the state

S#N - Non-breeding status of animal within the state. Usually applied to winter resident species.

S#? - Inexact or uncertain numeric rank.

SH - Possibly extirpated (Historical). Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.

S#S#- Range rank; A numeric range rank, (e.g. S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank.

SU - Unrankable; Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNR- Unranked; state rank not yet assessed.

SX - Presumed extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SNA- A conservation status rank is not applicable because the element is not a suitable target for conservation activities.

Global Ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note GX

These ranks should not be interpreted as legal designations.

FEDERAL STATUS

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered
C - Candidate (formerly C1 - Candidate category 1)

LT - Listed Threatened
E(S/A) - treat as endangered because of similarity of appearance

PE - Proposed Endangered
T(S/A) - treat as threatened because of similarity of appearance

PT - Proposed Threatened
SOC - Species of Concern species that merit special concern (not a regulatory category)

STATE LEGAL STATUS

The Division of Natural Heritage uses similar abbreviations for State endangerment:

LE - Listed Endangered
LT - Listed Threatened

PE - Proposed Endangered
PT - Proposed Threatened

SC - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)
C - Candidate

For information on the laws pertaining to threatened or endangered species, please contact:
U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;
Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE listed plants and insects**
Department of Game and Inland Fisheries for all other **STATE listed animals**

CONSERVATION SITES RANKING

Brank is a rating of the significance of the conservation site based on presence and number of natural heritage resources; on a scale of 1-5, 1 being most significant. Sites are also coded to reflect the presence/absence of federally/state listed species:

Conservation Site Ranks
B1 - Outstanding significance
B2 - Very High significance
B3 - High significance
B4 - Moderate significance

Legal Status of Sites
FL – Federally listed species present
SL – State listed species present
NL – No listed species present
B5 - Of general Biodiversity significance

NOTE: highlighted species may occur in project area [Hypes, 2005]

Figure 3: Juvenile Shad Push Net Surveys of the James River
(2002-2004)

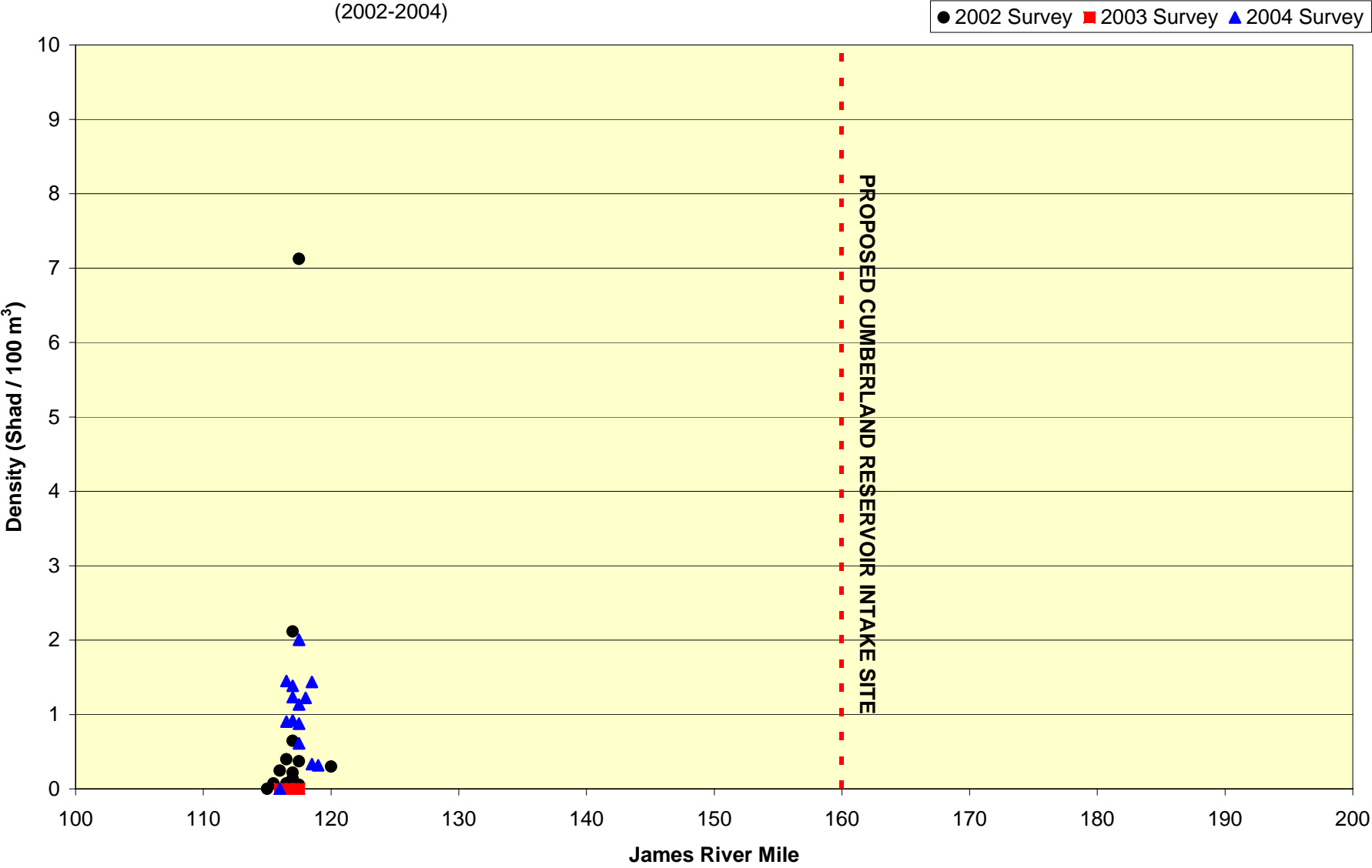


Figure 4: Juvenile Shad Snorkel Surveys of the James River
(1997-2001)

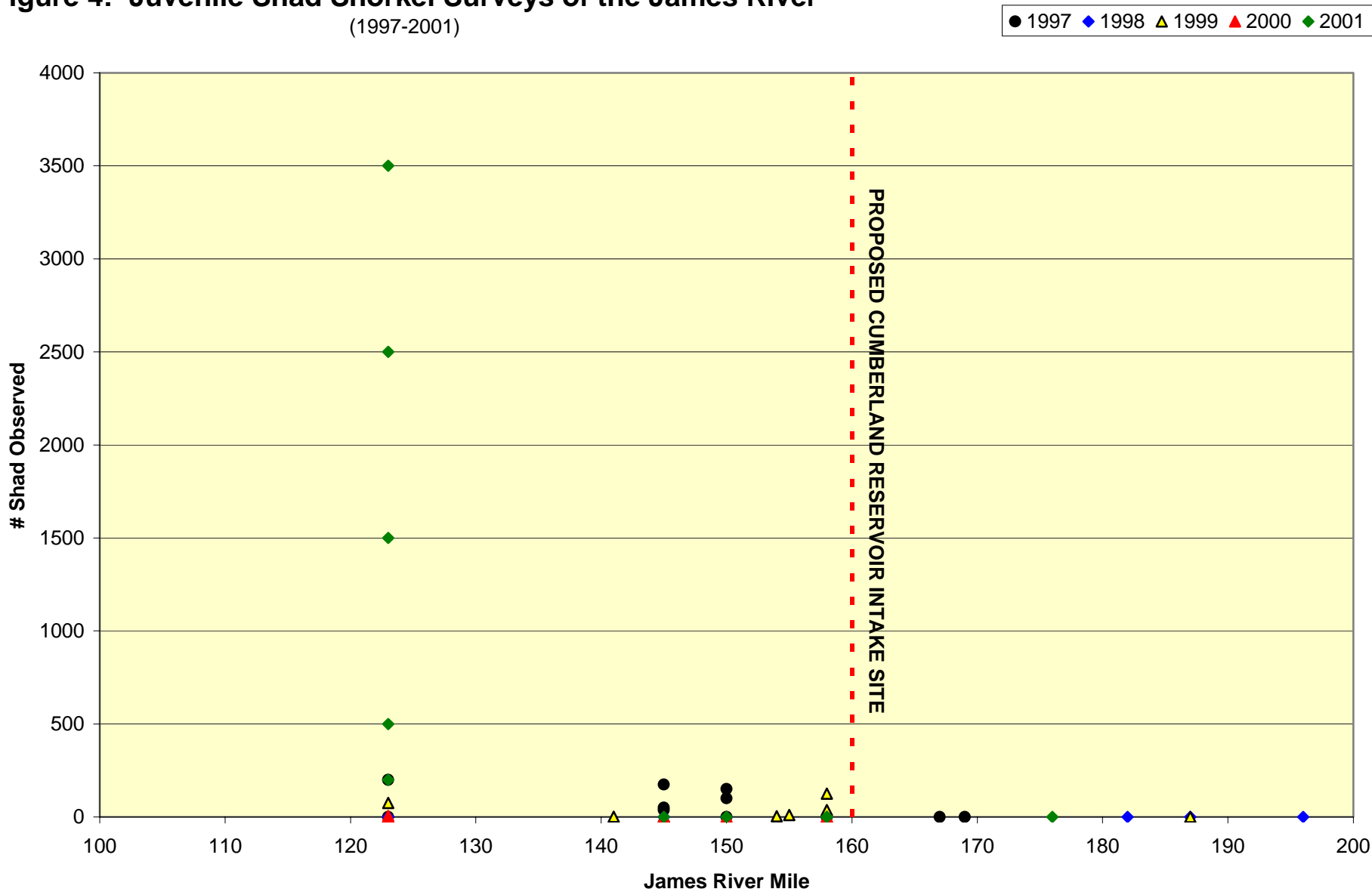


Figure 5: Juvenile Shad Electrofishing Surveys of the James River
(2001-2003)

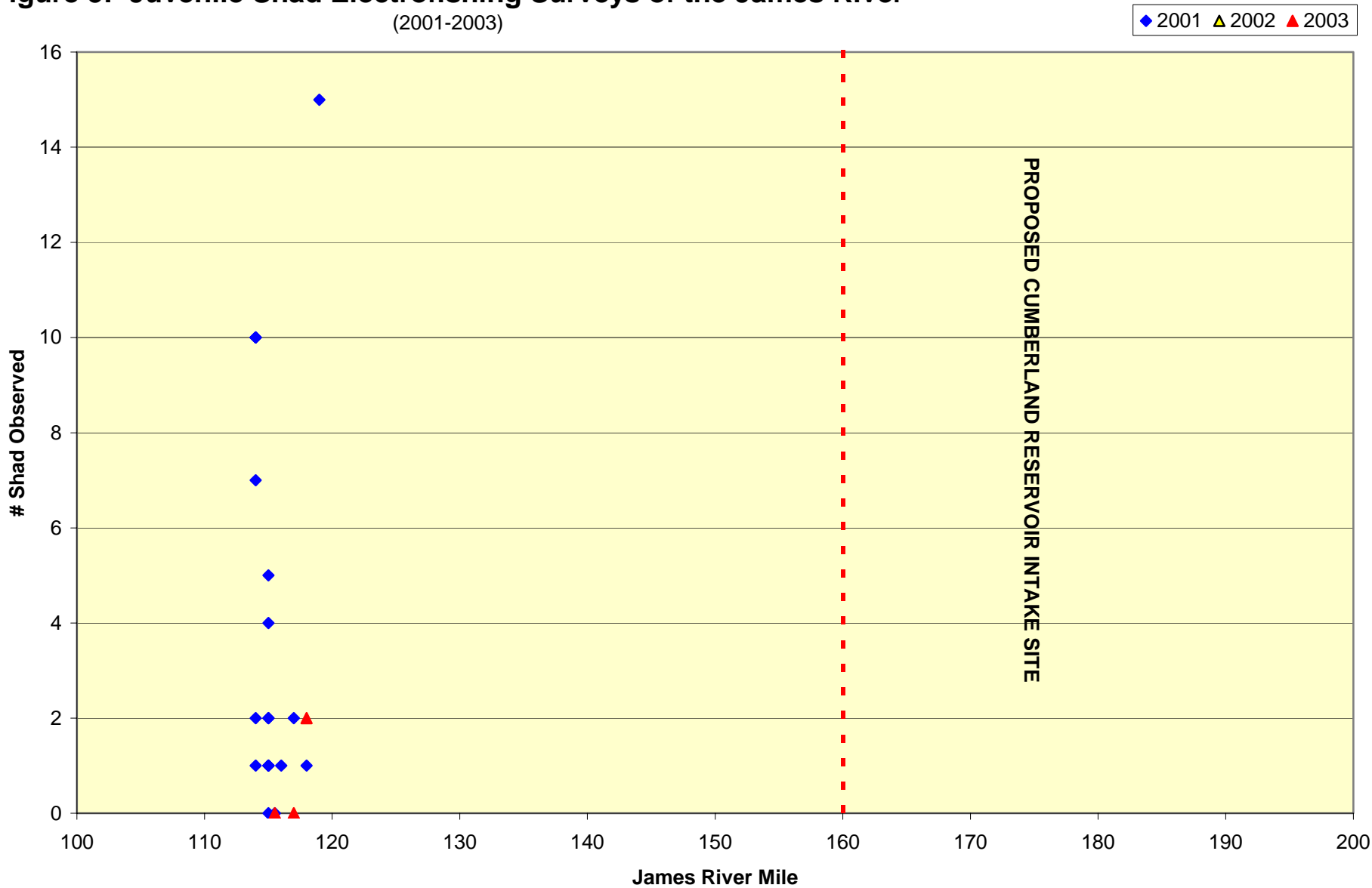


TABLE 2
Virginia Department of Game and Inland Fisheries
2002 to 2004 Juvenile Alosine Monitoring
James River Upstream of Boshers Dam Fishway

Nocturnal sampling with a bow mounted push net

2002 & 2003: 30" diam. Round net in June; 4' diam. Square net Jul to Oct

2004: 30" diam. Round net throughout sampling period

Prior to 8-12-02 the volume of water was measured with a Kahl Scientific flow meter

From 8-12-02 forward the volume of water was measured with a General Oceanics flowmeter

Push transects (1/2 mile each) are randomly chosen within river reach

* JRM = James River Mile (Proposed Cumberland County Reservoir Intake is at JRM 160)

** AMS = American shad, BLH = Blueback herring, ALE = Alewife herring

Date	Water Temp	Location*	JRM	Mesh (mm)	No. of Pushes	Minutes each push	Volume Sampled 100m3	AMS	Species**			Density		
									BLH	ALE		AMS/100m3	BLH/100m3	ALE/100m3
29-May-02	26.5	JRM 114-121	117.5	3.18	8	2, 10; 6, 5	19.37	138	0	0		7.12	0.00	0.00
4-Jun-02	28.5	JRM 114-121	117.5	3.18	6	5	18.91	7	0	0		0.37	0.00	0.00
10-Jun-02	29	JRM 114-121	117.5	3.18	6	5	18.44	1	0	0		0.05	0.00	0.00
17-Jun-02	27.5	JRM 114-120	117.0	3.18	6	5, 2; 1, 3	7.56	16	0	0		2.12	0.00	0.00
24-Jun-02	30	JRM 119-121	120.0	6.35	6	5	30.09	9	0	0		0.30	0.00	0.00
1-Jul-02	30	JRM 114-120	117.0	6.35	6	5	27.88	18	0	0		0.65	0.00	0.00
8-Jul-02	30	JRM 114-119	116.5	6.35	6	5	27.58	11	0	0		0.40	0.00	0.00
15-Jul-02	26.5	JRM 114-120	117.0	6.35	5	5	22.97	5	0	0		0.22	0.00	0.00
24-Jul-02	29	JRM 114-116	115.0	6.35	2	5	10.53	0	0	0		0.00	0.00	0.00
29-Jul-02	29.5	JRM 114-119	116.5	6.35	5	5	27.40	1	0	0		0.04	0.00	0.00
5-Aug-02	32	JRM 114-120	117.0	6.35	6	5	31.71	0	0	0		0.00	0.00	0.00
12-Aug-02	31	JRM 114-119	116.5	6.35	6	5	27.69	2	0	0		0.07	0.00	0.00
19-Aug-02	32	JRM 114-118	116.0	6.35	6	5	28.60	7	0	0		0.24	0.00	0.00
26-Aug-02	30	JRM 114-120	117.0	6.35	6	5	28.39	4	0	0		0.14	0.00	0.00
3-Sep-02	25	JRM 114-120	117.0	6.35	6	5	27.08	3	0	0		0.11	0.00	0.00
9-Sep-02	27	JRM 114-120	117.0	6.35	6	5	28.09	1	0	0		0.04	0.00	0.00
16-Sep-02	26	JRM 114-117	115.5	6.35	6	5	28.69	2	0	0		0.07	0.00	0.00
7-Oct-02	25	JRM 114-120	117.0	6.35	6	5	29.52	0	0	0		0.00	0.00	0.00
30-Jun-03		JRM 114-120	117.0	6.35	6	2, 5; 4, 10	19.22	0	0	0		0.00	0.00	0.00
16-Jul-03	27.6	JRM 115-117	116.0	6.35	4	5	11.06	0	0	0		0.00	0.00	0.00
6-Aug-03	27.4	JRM 114-119	116.5	6.35	6	5	15.59	0	0	0		0.00	0.00	0.00
08-Sep-03		JRM 114-121	117.5	6.35	6	5	15.98	0	0	0		0.00	0.00	0.00
02-Jun-04	23.2	JRM 114-121	117.5	3.18	6	10	32.74	20	0	0		0.61	0.00	0.00
07-Jun-04	20.1	JRM 114-120	117.0	3.18	6	10	31.01	43	0	0		1.39	0.00	0.00
14-Jun-04	23.1	JRM 114-120	117.0	3.18	6	5	16.29	15	0	0		0.92	0.00	0.00
21-Jun-04	25.1	JRM 114-121	117.5	3.18	6	5	17.98	36	0	0		2.00	0.00	0.00
28-Jun-04	25.3	JRM 116-121	118.5	3.18	6	5	17.42	25	0	0		1.44	0.00	0.00
13-Jul-04	28.1	JRM 115-121	118.0	6.35	6	1, 10; 5, 5	18.80	23	0	0		1.22	0.00	0.00
19-Jul-04	26.2	JRM 114-119	116.5	6.35	6	1, 2.5; 5, 5	12.16	11	0	0		0.90	0.00	0.00
28-Jul-04	25.2	JRM 114-121	117.5	6.35	6	5	16.77	19	0	0		1.13	0.00	0.00
03-Aug-04	27.2	JRM 116-121	118.5	6.35	6	5	17.95	6	0	0		0.33	0.00	0.00
09-Aug-04	25.3	JRM 114-119	116.5	6.35	6	5	19.31	28	0	0		1.45	0.00	0.00
17-Aug-04	23.4	JRM 114-120	117.0	6.35	6	1, 3; 5, 5	17.83	22	0	0		1.23	0.00	0.00
23-Aug-04	25.6	JRM 116-119	117.5	6.35	6	5	18.26	16	0	0		0.88	0.00	0.00
02-Sep-04	26.2	JRM 117-121	119.0	6.35	6	5	19.04	6	0	0		0.32	0.00	0.00
14-Sep-04	21.7	JRM 114-118	116.0	6.35	6	2, 5; 4, 10	32.84	0	0	0		0.00	0.00	0.00

Note: A small fraction of the total American shad collected upstream of Boshers Dam were wild fish; the vast majority were of hatchery origin.

Prepared by Alan Weaver, VDGIF Fish Passage Coordinator, for Malcolm-Pirnie; November 5, 2004

TABLE 3
Virginia Department of Game and Inland Fisheries
1997-2001 Juvenile American Shad Snorkel Surveys
Upper James River

Prepared by Alan Weaver, VDGIF Fish Passage Coordinator, for Malcolm-Pirnie
8-Nov-04

Method: Visual survey by snorkel followed with boat electrofishing (PPAS - pre-position aerial shockin
except for * haul seine and ** by hand

Proposed Cumberland County Reservoir Intake at James River mile 160

Date	Location	River Mile	Hours in Water	Observers	Shad Observed	Shad Collected
14-Jul-97	Cartersville	150	1	3	150	13*
21-Jul-97	Cartersville	150	2	3	100+	53
5-Aug-97	Westview	145	4	3	50	0
12-Aug-97	Westview	145	3	3	150-200	1**
26-Aug-97	Bremo Bluff	169	3	3	0	0
27-Aug-97	Watkins	123	4	3	200	33
2-Sep-97	Bremo Bluff	167	2	3	0	0
4-Sep-97	Westview	145	4	4	25-50	0
9-Sep-97	Columbia	158	3	2	0	0
25-Sep-97	Cartersville	150	2	2	0	0
7-Oct-97	Watkins	123	2	2	0	0
15-Jul-98	Watkins	123	2	2	0	0
15-Jul-98	Westview	145	2	3	0	0
21-Jul-98	Westview	145	3	2	0	0
21-Jul-98	Cartersville	150	2	2	0	0
22-Jul-98	Scottsville	182	1.5	4	0	0
5-Aug-98	Hatton	187	3	2	0	0
5-Aug-98	Howardsville	196	0.5	2	0	0
14-Jun-99	Rivanna at Crofton		4	2	0	0
14-Jun-99	Rivanna at Palmyra		2	2	0	0
07-Jul-99	Watkins	123	1	3	0	0
26-Jul-99	Westview	145	15	1	0	0
29-Jul-99	Hatton	187	2	3	0	0
29-Jul-99	Columbia	158	7	3	25-50	0
04-Aug-99	Columbia	158	2	4	100-150	41
11-Aug-99	Elk Island	155	1	2	11	0
17-Aug-99	Elk Island	154	2	2	4	0
18-Aug-99	Westview	145	5	3	0	0
18-Aug-99	Watkins	123	10	3	50-100	27
24-Aug-99	Rock Castle	141	1	2	1	0
19-Jul-00	Watkins	123	4	5	5	0
09-Aug-00	Columbia	158	0.5	1	0	0
15-Aug-00	Watkins	123	3	3	0	0
21-Aug-00	Columbia	158	1.5	6	0	0
22-Aug-00	Westview	145	2.5	7	0	0
22-Aug-00	Cartersville	150	1	3	0	0
13-Jul-01	Watkins	123	0.8	4	2500	14
17-Jul-01	Columbia	158	1.5	5	0	0
17-Jul-01	Watkins	123	immediate	5	3500	9
24-Jul-01	Cartersville	150	0.5	4	0	0
24-Jul-01	Westview	145	2	4	0	0
7-Aug-01	Watkins	123	immediate	3	1500	15
21-Aug-01	Hardware	176	2.5	3	0	0
21-Aug-01	Columbia	158	0.5	3	0	0
30-Aug-01	Watkins	123	immediate	4	500	0
7-Sep-01	Watkins	123	immediate	2	200	22

This work was done as part of the American Shad Restoration Project with cooperation from the USFV
Goal was not always to collect all fish observed.
The vast majority of American shad collected were of hatchery origin

TABLE 4
Virginia Department of Game and Inland Fisheries
2001-2003 Juvenile Alosine Electrofishing Monitoring
James River Upstream of Boshers Dam Fishway

Prepared by Alan Weaver, VDGIF Fish Passage Coordinator, for Malcolm-Pirnie
8-Nov-04

Sampling Method: Nocturnal boat electrofishing (120 Hz; DC, ~ 5 amps, ~ 1000 Volts, ~ 5000 Watts)
Standard of 6 electrofishing transects per night

Proposed Cumberland County Reservoir Intake is at River Mile 160

American Shad Juvenile Results

Date	Water Temp.	River Mile	River Mile	N	CPUE (fish/min)
11-Jul-01	29.0	115	115	4	0.40
11-Jul-01	29.0	117	117	2	0.27
07-Aug-01	29.5	114-117	115.5	0	0.00
04-Sep-01	26.0	118	118	1	0.14
04-Sep-01	26.0	119	119	15	2.14
18-Sep-01	23.5	114	114	2	0.29
18-Sep-01	23.5	114	114	7	1.00
18-Sep-01	23.5	115	115	2	0.29
18-Sep-01	23.5	115	115	1	0.14
18-Sep-01	23.5	115	115	2	0.29
18-Sep-01	23.5	115	115	5	0.71
09-Oct-01	18.5	114	114	10	1.43
09-Oct-01	18.5	114	114	1	0.14
09-Oct-01	18.5	115	115	1	0.14
09-Oct-01	18.5	116	116	1	0.14
23-Oct-01	18.5	114	114	10	1.43
23-Oct-01	18.5	114	114	10	1.43
23-Oct-01	18.5	115	115	1	0.14
31-Oct-01	18.0	114-116	115	0	0.00
11-Oct-02	10.0	114-118	116	0	0.00
23-Jul-03	26.7	118	118	2	0.20
30-Jul-03	26.5	115-119	117	0	0.00
15-Sep-03	23.5	114-117	115.5	0	0.00

Note: Each individual mile record represents an individual electrofishing transect that resulted in the collection of American shad juveniles

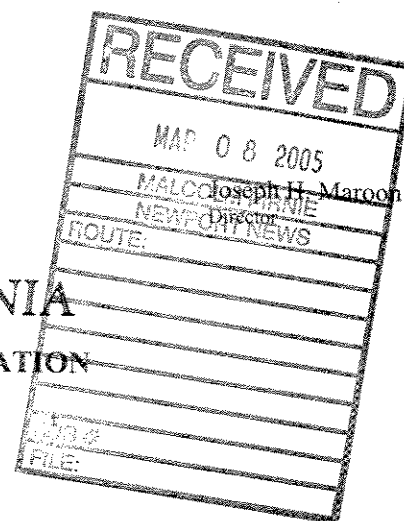
On dates when no shad were collected the range of miles sampled is shown

W. Tayloe Murphy, Jr.
Secretary of Natural
Resources



COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
Telephone (804) 786-7951 FAX (804) 371-2674 TDD (804) 786-2121



March 3, 2005

Paul Peterson
Malcolm Pirnie, Inc.
701 Town Center Drive, Suite 600
Newport News, VA 23606

Re: Cumberland County Reservoir Project

Dear Mr. Peterson:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the yellow lance (*Elliptio lanceolata*, G2G3/S2S3/SOC/SC) has been documented in the James River. The yellow lance occurs in mid-sized rivers and second and third order streams. To survive, it needs a silt-free, stable streambed and well-oxygenated water that is free of pollutants. In Virginia, the yellow lance is currently known from populations in the Chowan, James, York, Rappahannock, and Potomac River drainages. Please note that the yellow lance is currently classified as a special concern species by the Virginia Department of Game and Inland Fisheries (VDGIF) and a species of concern by the United States Fish and Wildlife Service (USFWS); however, these designations have no official legal status.

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

In addition, according to DCR biologists potential exists for rare odonates and significant communities within the project area. According to Dr. Steve Roble, DCR zoologist, potential exists for the Appalachian snaketail (*Ophiogomphus incurvatus*, G3/S1/NL/NL), Selys' sundragon (*Helocordulia selysii*, G4/S2/NL/NL) and Piedmont clubtail (*Gomphus parvidens*, G4/S1/NL/NL) in Cobbs Creek.

Adult Odonata (dragonflies and damselflies), commonly seen flitting and hovering along the shores of most freshwater habitats, are accomplished predators. Adults typically forage in clearings with scattered trees and shrubs near the parent river. They feed on mosquitoes and other smaller flying insects,

*State Parks • Soil and Water Conservation • Natural Heritage • Outdoor Recreation Planning
Chesapeake Bay Local Assistance • Dam Safety and Floodplain Management • Land Conservation*

and are thus considered highly beneficial. Odonates lay their eggs on emergent vegetation or debris at the water's edge. Unlike the adults, the larvae have an aquatic larval stage where they typically inhabit the sand and gravel of riffle areas. Wingless and possessing gills, they crawl about the submerged leaf litter and debris stalking their insect prey. The larvae seize unsuspecting prey with a long, hinged "grasper" that folds neatly under their chin. When larval development is complete, the aquatic larvae crawl from the water to the bank, climb up the stalk of the shoreline vegetation, and the winged adult emerges (Hoffman 1991; Thorpe and Covich 1991). Because of their aquatic lifestyle and limited mobility, the larvae are particularly vulnerable to shoreline disturbances that cause the loss of shoreline vegetation and siltation. They are also sensitive to alterations that result in poor water quality, aquatic substrate changes, and thermal fluctuations.

Furthermore elsewhere in Cumberland County, Gary Fleming, DCR Vegetation Ecologist has seen outstanding examples of Basic Mesic Forest and Basic Oak-Hickory Forests communities on bluffs that closely subtend the James River similar to those in the project vicinity. Also a survey conducted of a potential powerline right-of-way by Tom Wieboldt several years in the proposed project area identified numerous seepage habitats, which could represent significant Mountain/Piedmont Basic or Acidic Seepage Swamps depending on the substrates. These communities are described in "The Natural Communities of Virginia Classification of Ecological Community Groups Second Approximation (Version 2.0)" located on DCR's website at <http://www.dcr.virginia.gov/dnh/ncintro.htm>.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory of suitable habitat in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at (804) 371-6206 to discuss arrangements for field work. A list of other individuals who are qualified to conduct inventories may be obtained from the USFWS.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

Due to an increasing number of requests and limiting staffing resources, effective July 1, 2003 DCR-DNH will require 30 days to comment on projects submitted for our review.

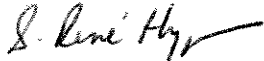
A fee of \$120.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, 203 Governor Street, Suite 414, Richmond, VA 23219, ATTN: Cashier. Payment is due within thirty days of the invoice date.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain

information not documented in this letter. Their database may be accessed from
http://www.dgif.virginia.gov/wildlife/info_map/index.html , or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. René Hypes
Project Review Coordinator

CC: Andy Zadnik, VDGIF
Kim Marbain, USFWS

Literature Cited

Fleming, G.P., P.P. Coulling, K.D. Patterson, and K.M. McCoy. 2004. The natural communities of Virginia: classification of ecological community groups. Second approximation. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA.
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Hoffman, R. 1991. Arthropods. Pp. 173 in: K. Terwilliger (ed.), Virginia's Endangered Species: proceedings of a symposium. The McDonald and Woodward Publishing Company, Blacksburg, VA.

Thorpe, J.H., and A.P. Covich. 1991. Ecology and Classification of North American Freshwater Invertebrates. Academic Press, Inc., San, Diego, California.

Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18: 6-9.

**Definitions of Abbreviations Used on Natural Heritage Resource Lists
of the
Virginia Department of Conservation and Recreation**

Natural Heritage State Ranks

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

S1 - Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer populations or occurrences, or very few remaining individuals (<1000).

S2 - Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 populations or occurrences or few remaining individuals (1,000 to 3,000).

S3 - Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically having 21 to 100 populations or occurrences (1,000 to 3,000 individuals).

S4 - Apparently secure; Uncommon but not rare, and usually widespread in the state. Possible cause of long-term concern. Usually having >100 populations or occurrences and more than 10,000 individuals.

S5 - Secure; Common, widespread and abundant in the state. Essentially ineradicable under present conditions, typically having considerably more than 100 populations or occurrences and more than 10,000 individuals.

S#B - Breeding status of an animal within the state

S#N - Non-breeding status of animal within the state. Usually applied to winter resident species.

S#? - Inexact or uncertain numeric rank.

SH - Possibly extirpated (Historical). Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.

S#S# - Range rank; A numeric range rank, (e.g. S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank.

SU - Unrankable; Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNR - Unranked; state rank not yet assessed.

SX - Presumed extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SNA - A conservation status rank is not applicable because the element is not a suitable target for conservation activities.

Natural Heritage Global Ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note GX means the element is presumed extinct throughout its range. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity. **These ranks should not be interpreted as legal designations.**

FEDERAL LEGAL STATUS

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered

LT - Listed Threatened

PE - Proposed Endangered

PT - Proposed Threatened

C - Candidate (formerly C1 - Candidate category 1)

E(S/A) - treat as endangered because of similarity of appearance

T(S/A) - treat as threatened because of similarity of appearance

SOC - Species of Concern species that merit special concern (not a regulatory category)

NL - no federal legal status

STATE LEGAL STATUS

The Division of Natural Heritage uses similar abbreviations for State endangerment.

LE - Listed Endangered
PE - Proposed Endangered
SC - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)
LT - Listed Threatened
PT - Proposed Threatened
C - Candidate
NL - no state legal status

For information on the laws pertaining to threatened or endangered species, please contact:

U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;
Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE** listed plants and insects
Department of Game and Inland Fisheries for all other **STATE** listed animals

Conservation Sites Ranking

Rank is a rating of the significance of the conservation site based on presence and number of natural heritage resources; on a scale of 1-5, 1 being most significant. Sites are also coded to reflect the presence/absence of federally/state listed species:

<u>Conservation Site Ranks</u>	<u>Legal Status of Site</u>
B1 - Outstanding significance	FL - Federally listed species present
B2 - Very High significance	SL - State listed species present
B3 - High significance	NL - No listed species present
B4 - Moderate significance	
B5 - Of general Biodiversity significance	